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PISTILLARIA (SUBG. PISTILLINA) THAXTERI, BURT N. SP.¹

THE SMALLEST KNOWN HYMENOMYCETE

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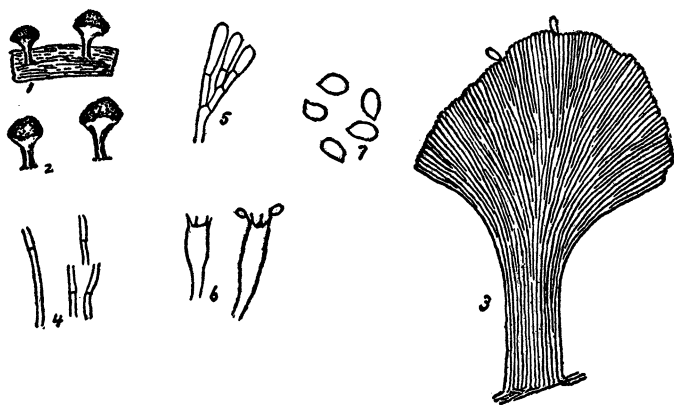
On a recent visit to the Mycological Herbarium of Harvard University, I was given for study by Professor Thaxter a curious fungus, collected at West Haven, Connecticut, in 1888. This fungus is a hymenomycete of very simple structure and exceedingly minute size — so minute that the fructifications are not visible to the naked eye unless rendered so by special illumination and background, as in the case of the dust particles of the air becoming visible in a beam of sunlight thrown across a darkened room.

By the aid of a lens the fructifications may be seen scattered on the surface of very rotten wood, merely gregarious, not united into clusters. One hundred and fifteen have been counted on an area 2 cm. long by $\frac{1}{2}$ cm. broad. The fructifications, after being kept twenty-eight years in the herbarium, are whitish to cartridge-buff throughout; each has a subglobose head, the pileus supported on a slender stem, and in its form suggests the sporangium of a minute myxomycete, such as a *Physarum*. In figs. 1 and 2 are shown two fructifications under magnification of 63 diameters; in fig. 1 these fructifications were sketched in dry condition, as they were on the

¹ Issued January 12, 1917.

wood; in fig. 2 the same fructifications are shown after being removed from the wood and mounted in water.

The structure of the fructification is shown by the higher magnification of fig. 3. From a layer of hyphae at or near the surface of the substratum, hyphae start out together at right angles to the substratum and are closely joined in a



Pistillaria Thaasteri: 1, two fructifications in dried condition on wood, $\times 63$; 2, the same fructifications in an aqueous mount, $\times 63$; 3, median longitudinal optical section of a fructification, $\times 380$; 4, hyphae, showing absence of clamp connections, $\times 640$; 5, cluster of young basidia, $\times 640$; 6, two basidia with sterigmata, $\times 640$; 7, five basidiospores, $\times 640$.

cylindric column about $60\ \mu$ long and $20\text{--}40\ \mu$ in diameter in the dried specimens, swelling to $25\text{--}50$, and rarely $80\ \mu$, in diameter when the specimens are wet, treated with potassium hydrate or lactic acid, and mounted in microscopical preparations. These hyphae are hyaline, thin-walled, about $1\frac{3}{4}\text{--}2\ \mu$ in diameter, and not incrusted nor nodose-septate (fig. 4). At the outer end of the stem the hyphae pass into the pileus which is distinguishable from the stem by its obversely conical form, as shown under a magnification of 380 diameters in fig. 3. The obconical form of the pileus is due to repeated branching of its hyphae as they extend directly from the stem to the surface of the pileus. The manner of branching and of increase in diameter of the pileus is shown in figs. 3 and 5. At the outer peripheral end the terminal cell of each hyphal branch becomes swollen with pro-

toplasmic contents and differentiates into a simple basidium somewhat clavate in form, $13-17 \times 4-4\frac{1}{2} \mu$, when fully mature, which bears four spores upon short sterigmata (figs. 5 and 6). The spores are hyaline, even, slightly flattened on one side, pointed at the base, $5-9 \times 3\frac{1}{2} \mu$ (fig. 7). No cystidia, hairs, or organs other than basidia have been found in the hymenium.

This fungus is remarkable not only for its minute size—and it is by far the smallest known species of the toadstool kind—but also for its extreme simplicity of structure. A few hyphae extend out together in a compact bundle from the vegetative mycelium, and at a little distance from the substratum simply branch and terminate in basidia bearing the usual basidiospores. No additional accessory, supporting, or secretory organs of any kind are differentiated, nor is there any perceptible differentiation into cortical and medullary regions in the fructification, nor any curvature of the fertile hyphae so that the basidia will be directed towards special cavities or towards the substratum; on the contrary, the whole fructification is as simple as a sheaf of wheat. A few hyphae stand out together from the substratum—probably for mutual support—and produce as simply and directly as possible their complement of basidia and basidiospores, and form both distinct stem and pileus of the simplest possible structure. The primordium of the pileus in its ontogeny in more highly developed species is not simpler.

Quelet¹ published under the name *Pistillina hyalina* Quelet, n. gen. and sp. the description of a fungus closely related to the American species which I am describing. *P. hyalina* is ten times as large as our fungus, clearly visible to the naked eye, and has elongated, aculeate spores. Quelet's genus *Pistillina* is regarded as a subgenus under *Pistillaria* of the *Clavariaceae* by Saccardo.² While *Pistillina* appears to be a needed genus for such species as that for which it was founded and for the present American species, still the few species

¹ Champ. Jura et Vosges, Suppl. 10, Assoc. Fr. Avanc. Sci. 9: 671. pl. 8. f. 12. 1880.

² Syll. Fung. 6: 759. 1888.

which would be clearly comprehended by it would be connected with the usual elongated forms of *Pistillaria* by some intermediate species found in Europe, where the species of *Pistillaria* appear to be more numerous and more frequent than in North America.

The present American species may be characterized as follows:

Pistillaria (subgen. ***Pistillina***) ***Thaxteri*** Burt, n. sp.

Fructifications gregarious, pileate, erect, drying whitish to cartridge-buff; pileus hemispherical, puberulent, attenuated at the base into a cylindric stem composed of hyaline, thin-walled, even-walled, parallel hyphae about $1\frac{3}{4}$ – $2\ \mu$ in diameter, not nodose-septate, not incrustated; basidia simple, subclavate, $13\text{--}17 \times 4\text{--}4\frac{1}{2}\ \mu$, with four sterigmata; spores hyaline, even, flattened on one side, pointed at the base, $5\text{--}9 \times 3\frac{1}{2}\text{--}4\frac{1}{2}\ \mu$; no cystidia nor paraphyses.

Fructification 100–110 μ high; pileus 50–110 μ in diameter, 40–50 μ long; stem about 60 μ long, 20–50 μ , rarely 80 μ , in diameter.

On rotten wood, West Haven, Connecticut, November 7, 1888, *R. Thaxter*, type (in Farlow Herb. and Mo. Bot. Gard. Herb., 5724).

The fructifications are but a fraction of the size of those of any other species of the genus and not visible to the naked eye.